

CLAIMS

The following is claimed:

1. An apparatus for generating a membrane target for laser produced plasma comprising:

5 a member including at least one aperture, wherein each aperture is operable for providing a liquid membrane target that is supported within the aperture by the surface tension of the liquid; and

a targeting apparatus operable to direct short wavelength radiation onto the liquid membrane target so as to generate plasma.

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2. An apparatus according to claim 1, wherein the member comprises a disc having the aperture(s) disposed at the periphery of the disc.

3. An apparatus according to claim 2, further comprising:

15 a motor connected to the disc and operable to rotate the disc;

a reservoir operable for storing liquid target solution wherein the disc is positioned so that the aperture passes through liquid target solution as the disc is rotated and the liquid membrane target is formed at each aperture as it emerges from the reservoir.

20 4. An apparatus according to claim 2, further comprising a debris containment shield positioned around the disc.

5. An apparatus according to claim 1 wherein each of the apertures is substantially circular.

5 6. An apparatus according to claim 1 wherein each of the apertures is substantially oval.

7. An apparatus according to claim 1 wherein each of the apertures is substantially arc-shaped.

10 8. An apparatus according to claim 1 wherein the target material comprises tin (Sn).

9. An apparatus according to claim 1 wherein the target material is a solution comprising a metallic material selected from the group consisting of tin chloride (SnCl_2), zinc chloride (ZnCl), tin oxide (SnO_2), lithium (Li), lead (Pb), and iodine (I).

10. An apparatus according to claim 9 wherein the solution comprises a mixture of the metallic material with water.

20 11. An apparatus according to claim 2 wherein a membrane target is formed in each of the aperture(s) by centrifugal motion, the apparatus further comprising:

a motor connected to the disc and operable to rotate the disc; and

a target solution dispenser positioned adjacent to the disc such that liquid target solution can be dispensed onto the center of the disc and dispersed about the periphery of the disc when the disc rotates.

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12. An apparatus according to claim 11, further comprising:

a target solution reservoir containing liquid target solution, the target solution reservoir connected the target solution dispenser;

a circular splash guard connected to the target solution reservoir and positioned around
10 the periphery of the disc such that excess target solution will be captured by the splash guard
when target solution is dispensed onto a rotating disc.

13. An apparatus according to claim 11, further comprising a blower positioned
adjacent to the disc and operable to apply pressure to a liquid membrane target so as generate a
15 spherical membrane target on an opposite side of the member.

14. An apparatus for generating a spherical membrane target for laser produced plasma comprising:

a member including at least one aperture, wherein each aperture is operable for providing a liquid membrane target that is supported within the aperture by the surface tension of the liquid;

a blower positioned adjacent to one side of the member, the blower operable for applying pressure to the liquid membrane target so as to generate a spherical membrane target on an opposite side of the member; and

a targeting apparatus operable to direct short wavelength radiation onto the spherical membrane target so as to generate plasma.

15. An apparatus according to claim 14, wherein the blower blows an inert gas against the membrane target.

16. An apparatus according to claim 14, wherein the member comprises a disc having the aperture(s) disposed at the periphery of the disc.

17. An apparatus according to claim 16, further comprising:

a motor connected to the disc and operable to rotate the disc;

a reservoir operable for storing liquid target solution wherein the disc is positioned so that the aperture passes through liquid target solution as the disc is rotated and the liquid membrane target is formed at each aperture as it emerges from the reservoir.

5 18. An apparatus according to claim 16, further comprising a debris containment shield positioned around the disc.

 19. An apparatus according to claim 14 wherein each of the apertures is substantially circular.

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 20. An apparatus according to claim 14 wherein each of the apertures is substantially oval.

 21. An apparatus according to claim 14 wherein the target material comprises tin
15 (Sn).

 22. An apparatus according to claim 14 wherein the target material is a solution comprising a metallic material selected from the group consisting of tin chloride (SnCl_2), zinc chloride (ZnCl), tin oxide (SnO_2), lithium (Li), lead (Pb), and iodine (I).

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23. An apparatus according to claim 22 wherein the solution comprises a mixture of the metallic material with water.

24. An apparatus according to claim 16 wherein a membrane target is formed in each of the aperture(s) by centrifugal motion, the apparatus further comprising:

a motor connected to the disc and operable to rotate the disc; and

a target solution dispenser positioned adjacent to the disc such that liquid target solution can be dispensed onto the center of the disc and dispersed about the periphery of the disc when the disc rotates.

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25. An apparatus according to claim 24, further comprising:

a target solution reservoir containing liquid target solution, the target solution reservoir connected the target solution dispenser;

a circular splash guard connected to the target solution reservoir and positioned around the periphery of the disc such that excess target solution will be captured by the splash guard when target solution is dispensed onto a rotating disc.

26. An apparatus for generating a spherical membrane target for laser produced plasma comprising:

a first hollow member operable to provide a liquid target solution from a first end;

5 a second hollow member disposed within the first hollow member wherein the second hollow member is operable to provide a gas from a first end so that a spherical membrane target is formed at the first end.

a targeting apparatus operable to direct short wavelength radiation onto the spherical membrane target so as to generate plasma.

10 27. An apparatus according to claim 26, further comprising a debris containment shield positioned around the disc.

28. An apparatus according to claim 26 wherein the target material comprises tin (Sn).

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29. An apparatus according to claim 26 wherein the target material is a solution comprising a metallic material selected from the group consisting of tin chloride (SnCl_2), zinc chloride (ZnCl), tin oxide (SnO_2), lithium (Li), lead (Pb), and iodine (I).

20 30. An apparatus according to claim 29 wherein the solution comprises a mixture of the metallic material with water.

31. A method of providing a spherical membrane target for laser produced plasma comprising:

providing a member including at least one aperture;

applying a liquid target material to the member so as to form a membrane target that is
5 supported within the aperture by the surface tension of the liquid; and

applying short wavelength radiation onto the liquid membrane target so as to generate plasma.

32. A method according to claim 31, wherein the member comprises a disc having the
10 aperture(s) disposed at the periphery of the disc, the method further comprising:

rotating the disc through a reservoir containing liquid target solution wherein the disc is positioned so that each of the apertures passes through liquid target solution as the disc is rotated and forms a liquid membrane target as it emerges from the reservoir.

15 33. A method according to claim 31, further comprising:

applying a stream of gas to the liquid membrane target so as to generate a spherical membrane.

34. A method according to claim 31, wherein the member comprises a disc having the
20 aperture(s) disposed at the periphery of the disc, the method further comprising:

dispensing a target solution onto the center of the disc; and

rotating the disc so that the target solution is dispensed about the periphery of the disc where it forms a target membrane within each of the apertures.

35. A method according to claim 34, further comprising:

5 blowing a gas against a liquid membrane target as generate a spherical membrane target on an opposite side of the member.

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